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EXAMINER	
MILLER, MARTIN E	
ART UNIT	**PAPER NUMBER**
2623	9

DATE MAILED: 05/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/982,048	Applicant(s) GANZ ET AL.	
	Examiner Martin Miller	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on February 19, 2003. However, Applicant has not properly submitted the drawing change per MPEP 608.02(p). When properly submitted the drawing change will be accepted by the examiner.

Response to Arguments

2. The declaration filed on February 19, 2003 under 37 CFR 1.131 is sufficient to overcome the Jurisica reference.

Applicant's arguments filed February 19, 2003 have been fully considered but they are not persuasive. Applicant argues that "DeTitta is an improper reference due to the fact that it does not provide a description that is adequate so that one of ordinary skill in the art would be able to make and use the invention presently claimed". Since DeTitta is an issued United States Patent, it is presumed to be valid and fulfilling all Section 112 criteria (see 35 U.S.C. 282); therefore, DeTitta is a proper reference. It may have taken applicant 36 pages and 26 drawing sheets to describe Applicant's invention, but Applicant has chosen to claim the broadest embodiment of the invention. For instance, applicant does not claim the novel or the non-obvious features disclosed in the specification (e.g. details of the automatic classification computer program) that allow the instant invention to provide a method of and device for inspecting and classifying a plurality of microscopic crystals.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 5, 6, 10, 13, 14, 17, 18, 22, 30, 31, 34, 35, and 39 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by DeTitta et al. (hereinafter DeTitta), US 6368402.

As per claim 1, DeTitta teaches:

A) at least one camera, (col. 10, ll. 41-42);

B) an indexing device ("custom built travel image stand", col. 10, ll. 38-41 and Daedal X-Y Precision with 4 axis indexing card, col. 10, ll. 47-50) for sequentially placing said microscopic crystals in camera view of said at least one camera (col. 10, ll. 42-43); and

C) at least one computer (figure 9) programmed to control said indexing device and said at least one camera, wherein said at least one computer is programmed (col. 10, ll. 63-65) to receive from said at least one camera images (col. 11, ll. 7-9) of said plurality of microscopic crystals, wherein said at least one computer is programmed to classify (encoded zero or one, col. 11, ll. 14-23) said plurality of microscopic crystals.

As per claim 2, DeTitta teaches:

a computer monitor (col. 10, l. 67-col. 11, l. 3, figure 9 , element 36), wherein an operator interfacing with said at least one computer manually inputs a score (a "1" or "0", col. 14-17) to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

As per claim 5, DeTitta teaches:

wherein each of said plurality of microscopic crystals are contained within a

drop of liquid (col. 9, ll. 52-57), wherein each drop of liquid is contained within a well of a micro-well plate (col. 10, ll. 2-3, see figures 1-4).

As per claim 6, DeTitta teaches:

wherein said plurality of microscopic crystals are a plurality of protein crystals inside the wells of at least one micro-well plate (col. 11, ll. 8-10, see figure 8).

As per claim 10, DeTitta teaches:

a frame grabber for receiving images of said plurality of microscopic crystals from said at least one camera (col. 10, ll. 52-53).

As per claim 13, DeTitta teaches:

A) sequentially placing said plurality of microscopic crystals in camera-view (col. 10, ll. 42-43) of at least one camera utilizing an indexing device (Daedal X-Y Precision with 4 axis indexing card, col. 10, ll. 47-50);

B) taking the images of said plurality of microscopic crystals with said at least one camera (video system records individual wells, col. 10, ll. 42-43 and feeds into a framegrabber, col. 10, ll. 51-53),

C) transferring said images to at least one computer (the images are recoded and saved to a file, col. 10, ll. 53-58),

D) receiving said images at said at least one computer (col. 10, l. 67-col. 11, ll. 3), and

E) classifying said images at said at least one computer (col. 11, ll. 8-17), wherein said at least one computer is programmed to control said at least one indexing device and said at least one camera (the table motion and image capturing is computer controlled, col. 10, ll. 52-55).

As per claim 14, DeTitta teaches:

wherein said step of classifying said images at said at least one computer is done manually, wherein an operator interfacing with said at least one computer and viewing a computer monitor (col. 11, ll. 8-11) manually inputs into said at least one computer a score ("1" or "0", col. 11, ll. 14-15) to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

As per claims 17, 18, and 22, these claims recite substantially the same limitations as claims 5, 6, and 10 above and analogous remarks apply.

As per claims 30, 31, 34, 35, and 39, they recite substantially the same limitations as claims 1, 2, 5, 6, and 10, above and analogous remarks apply.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 15 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to claim1, 13, and 30 above, and further in view of Hartley et al., (hereinafter Hartley), US 5544254.

As per claims 3, 15 and 32, DeTitta teaches that the computer presents the views to a user to classify; DeTitta does not specifically teach automatic classification. However, Hartley teaches:

wherein said at least one computer automatically classifies said plurality of microscopic crystals after receiving said images (col. 6, ll. 10-17, 36-43).

It would have been obvious to one of ordinary skill in the art to use the automatic classification system of Hartley in the system of DeTitta to eliminate human intervention in order to cope with the high-throughput of the robotic setup. Use of the automatic classification feature would clearly increase system speed and efficiency once optimized and provides data that may be used to alter the operating parameters of the crystal production process (Hartley, col. 6, ll. 37-40). One of ordinary skill in the art would be motivated to look to Hartley to see how others have classified crystals using image processing techniques.

As per claim 28, DeTitta does not specifically teach comparing images to images stored in the database, although he does teach comparing collected image data to data stored in the a database (comparison of precipitation scores, col. 11, ll. 26-50). However, Hartley teaches:
step of classifying said images at said at least one computer comprises the sub steps of:
A) comparing said images (col. 2, ll. 8-10) to a database (col. 2, ll. 10-12) stored on said at least one computer (col. 5, ll. 23-27), and
B) assigning a classification based on said comparison (col. 6, ll. 10-17, 36-43).

As per claim 29, DeTitta teaches:

A) making a determination as to whether a microscopic crystal exists (a "1", col. 11, l. 15),

B) making a determination as to what is present if said microscopic crystal does not exist, and (a "0", col. 11, l. 14). However, DeTitta does not specifically teach a determination of quality although DeTitta does teach such a feature.

C) making a determination as to the qualities of said microscopic crystal if said microscopic crystal does exist (uniform, granular or microcrystalline, p. 402, col. 1).

7. Claims 4, 16, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta, Harris and Update as applied to claims 7, 19, and 36 above, and further in view of Reimer et al., (hereinafter Reimer), US 60610861.

As per claim 4, DeTitta does not specifically teach the use of two cameras, However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view (fig. 3, element 20, col. 6, ll. 61-63, wherein said second camera comprises a motorized zoom lens controllable (fig. 3, element 30, col. 6, ll. 63-66) by said at least one computer (col. 7, ll. 20-28).

It would have been obvious to one of ordinary skill in the art to eliminate the data volume while still maintaining the processing capability equivalent to the human visual system, which provides the greatest accuracy in classifying image objects as defective (Reimer, col. 3, ll. 33-55).

8. Claims 7, 19, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to claims 1, 13 and 30 above, and further in view of Harris et al., (hereinafter Harris), US6388788 B1 and Automation Update (hereinafter Update), "Open for Inspection: Parker Daedal's New Positioner designed for Inspection Applications", Jan. 1998,www.textronics.com/ Newsletters/archivedarticles/1998/0198newsletter.pdf.

As per claims 7, 19, and 36, DeTitta teaches:

wherein said indexing device comprises:

A. a first linear actuator for horizontally positioning said positioning station (Daedal X-Y Precision, col. 10, ll. 48-53), Update teaches that the X-Y Precision can accept microscopes and

other machine vision inspection equipment. DeTitta nor Update specifically teach being able to move in a vertical axis, although DeTitta does teach that the plate glass and framework are controlled by a 4 axis indexing card. Four (4) axis to the examiner indicates movement in the X, Y, and Z axes. However Harris teaches:

B. a second linear actuator for horizontally positioning said at least one camera (col. 15, ll. 3-5, although Harris teaches an XY controller moves the 96 well (microtiter) plate, it would have been obvious to one of ordinary skill in the art that the camera could be moved instead of the well plate), and

C. a third linear actuator for vertically positioning said at least one camera (col. 14, l. 66).

It would have been obvious to one of ordinary skill in the art to use the suggestions of Update, which more thoroughly describes the custom capabilities of the Daedal X-Y Precision table disclosed in DeTitta, and those features disclosed in Harris to incorporate obvious camera manipulation apparatus into the custom built table and indexing device disclosed in DeTitta to provide the most cost effective by using commercial-of-the-shelf available parts and time efficient to keep up with the high throughput requirements of DeTitta (abstract) to build an indexing device. One of ordinary skill would be motivated to use the above prior art systems particularly since Harris is directed towards imaging a 96 well plate as is DeTitta.

9. Claims 8, 20 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta, Harris and Update as applied to claims 7, 19, and 36 above, and further in view of Reimer et al., (hereinafter Reimer), US 60610861.

As per claims 8, 20 and 37, DeTitta nor Update teach using two cameras. Harris teaches using two cameras (col. 16, ll. 53-56), but does not teach one camera having a constant zoom and

the other having a motorized zoom. Although Harris does teach a motorized zoom (col. 14, l. 66). However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view (figure 3, element 20, col. 6, ll. 62-63), wherein said second camera comprises a motorized zoom lens (col. 6, l. 63-.col. 7, l. 1) controllable by said at least one computer (col. 7, ll. 20-29).

It would have been obvious to one of ordinary skill in the art to use the two camera feature of Reimer in the system of DeTitta, Update and Harris, to provide accuracy in finding the well locations by allowing the wide field of view camera image to be scanned to locate target (wells) images, particularly since both DeTitta and Harris are directed towards locating well positions and performing high speed classification.

10. Claims 9, 11, 12, 21, 23, 24, 38, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to claims 1, 13, and 30 above, and further in view of Inokuchi, US 6259960 B1.

As per claims 9, 21, and 38, DeTitta discloses that the user can name a plate manually, but does not specifically state that a barcode is used. Nor does DeTitta teach a plate sensing device. However, Inokuchi teaches:

comprising a bar-code reader (col. 7, ll. 36-40 and col. 18, ll. 39-41) and a micro-well plate sensing device (part moving means moves the part to be inspected into the target coordinate region, col. 7, ll. 60-65, or alternatively, the state coordinate system is adjusted based upon the imaged x-y difference between the target coordinates and the state coordinates, col. 8, ll. 23-39).

It would have been obvious to one of ordinary skill in the art to use Inokuchi's automated bar-code reader to input the information regarding the plate instead of manually inputting that data into the computer which may result in mistaken information. Also, Inokuchi teaches that it is well known to have position sensing capabilities in inspection devices, which facilitates automated inspection because precise placement of the target plate is not a true concern. One of ordinary skill in the art would have been motivated to look at the inspection device of Inokuchi because it is directed towards automatic image processing of microscopic images for certain features to be found in the image. Inokuchi also has a manual inspection mode as well as an automatic inspection mode.

As per claims 11, 23, and 40, although DeTitta teaches that his inspection system is used on a computer, he does not specifically teach that is part of a network. Inokuchi is directed to a material-inspection and classification apparatus (col. 17, ll. 18-21, 24-26). However, as per claims 11, 23, and 40, Inokuchi teaches:

wherein said at least one computer is connected to a computer network. (figure 1, col. 16, ll. 60-65).

It would have been obvious to one of ordinary skill in the art to use the networking suggestion of Inokuchi in the inspection and classification system of DeTitta to facilitate management of classification information at a central location thereby making it unnecessary to save and download classification data from individual plate imaging stations of DeTitta (Inokuchi, col. 17, ll. 43-50).

As per claims 12, 24, and 41, Inokuchi teaches:

wherein said at least one computer network is the Ethernet. (col. 16, l. 65).

11. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to claims 13 above, and further in view of Bacus et al., (hereinafter Bacus), US 6226392 B1.

As per claim 25, DeTitta does not specifically teach color images are obtained of the crystals. However, Bacus teaches:

wherein said images of said plurality of microscopic crystals are color images. (col. 8, ll. 56-58)

It would have been obvious to one of ordinary skill in the art to use the color filter wheel of Bacus with the imaging sensor of DeTitta to provide color images that will allow for more accurate classification of crystals when classification may be based upon the certain colors in the crystals. Furthermore, Bacus teaches that color images have been well known in inspection systems for a number of years.

As per claim 26, Bacus teaches:

A) viewing each of said plurality of microscopic crystals through a first linear polarized filter (figure 4B, elements 172 or 170) and a second colored filter (figure 4B, element 180), wherein the color of said second colored filter is altered between red, green and blue (col. 8, ll. 57-58), to obtain a first image, a second image and a third image, and

B) combining said first image, said second image and said third image to obtain said true colored images (col. 8, ll. 59-62).

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta and Bacus as applied to claims 13 above, and further in view of Glazer et al (hereinafter Glazer), UK 2310925.

As per claim 27, Bacus does not specifically teach using false colors. However, Galzer teaches:

steps of viewing each of said plurality of microscopic crystals through a first linear polarized filter (figure 1, element 15) and a second linear polarized filter (figure 1, element 14) to obtain said false color images (p. 2, second paragraph).

It would have been obvious to one of ordinary skill in the art to use the false colors of Glazer in the color crystal images of DeTitta and Bacus to measure the refractive indices of a crystal which by using false colors allow for indications or measures across the sample for its optical anisotropy, which provides additional data to further classify any crystal material and take advantage of the image processing inspection system.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The examiner can normally be reached on Monday-Friday, 9am-5pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

mem
May 23, 2003

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